1905MNRAS..65..266N

1 Star.	2 R.A. 1900.	3 Dec. 1900.	4 Phot. Mag.	5 Parallax.	6 Spectrum.	7 Sun's mag. at Star's distance.	8 Relative Brightness.	Remarks.
	h m	° ′		″				
α Lyræ	18 33·6	+38 41	0·14	0·082	A	5·50	139·32	
α Aquilæ ...	19 45·9	+ 8 36	0·89	0·231*	A5F	3·25	87·91	
61 Cygni ...	21 2·1	+38 13	4·96	0·39*	H	2·11	0·07	Proper motion = 5″·16
δ Equulei ...	21 9·6	+ 9 36	4·61	0·071*	F	5·81	3·02	Mass = 1·89 × Sun Parallax from Spectroscopic measures by Hussey
ε Indi	21 55·7	−57 12	4·74	0·28*	K5M	2·83	0·17	
α Gruis	22 1·9	−47 27	2·16	0·015	B5A	9·19	648·63	
Fomalhaut ...	22 52·1	−30 9	1·30	0·130	A3F	4·50	18·88	
Lacaille 9352 ...	22 59·4	−36 26	7·1	0·29	...	2·78	0·018	Proper motion = 7″·0

On the Terms of Long Period in the Complete Expression for the Moon's Longitude. By E. Nevill.

The appearance of Mr. Cowell's Note in the Supplementry Number of the *Monthly Notices* (vol. lxiv. p. 838), on a term of long period in the Moon's longitude indicated by the observed errors in the tabular place of the Moon, suggests the desirability of my forwarding for publication the first few terms of the expression I have deduced for the correction of Hansen's tabular longitudes, which includes a number of terms of long period whose values I have determined.

This portion of the complete expression is

$$\begin{aligned}\Delta L = &+\{\,0''{\cdot}56 + 0{\cdot}44j\} \\ &+\{30{\cdot}60 + 0{\cdot}22j\}(T - 1800{\cdot}50) \\ &+\{\,4{\cdot}75\qquad\}(T - 1800{\cdot}50)^2 \\[1em] &+\ 1''{\cdot}15j\sin\{\,4E - 8M + 3J + 79^\circ\,\} \\ &+\ 4{\cdot}11\,.\sin\{\,3V - 7E + 4M + 327\,\} \\ &+15{\cdot}34\,.\sin\{18V - 16E - \alpha + 35{\cdot}3\}^* \\ &-14{\cdot}40\,.\sin\{18V - 16E - \alpha + 31{\cdot}7\} \\ &+21{\cdot}47\,.\sin\{\,8V - 13E + 274{\cdot}2\}^* \\ &-\ 7{\cdot}97\,.\sin\{\,8V - 13E + 227{\cdot}7\}\end{aligned}$$

1905MNRAS..65..266N

$$\begin{aligned}\Delta L = &- 0''\cdot 51 \,.\, \sin\{2\cdot 18(Y-1850\cdot 50)+130^\circ\}\\ &- 1\cdot 01 \,.\, \sin\{2\cdot 80(Y-1850\cdot 50)+240\}\\ &- 1\cdot 83 \,.\, \sin\{4\cdot 10(Y-1850\cdot 50)+200\}\\ &+ 0\cdot 24 \,.\, \sin\{5\cdot 03(Y-1850\cdot 50)+\ 46\}\\ &+ 1\cdot 29 \,.\, \sin\{6\cdot 40(Y-1850\cdot 50)+264\}\\ &+ 0\cdot 55 \,.\, \sin\{7\cdot 58(Y-1850\cdot 50)+153\}\\ &+ 0\cdot 92 \,.\, \sin\{9\cdot 69(Y-1850\cdot 50)+185\}\end{aligned}$$

+ terms of shorter period than thirty-five years.

The notation explains itself, and the correction is to be subtracted from the tabular longitude. The two terms marked with an asterisk are Hansen's two faulty *Venus* terms, which have to be removed from the tables.

If the observations considered are restricted to those made at Greenwich since 1750, a mere inspection of the outstanding errors shows that they can be represented roughly by an inequality having a period of from seventy to ninety years, and reaching its maximum about 1825.

In my earliest researches of twenty years ago I employed the term

$$+2''\cdot 80 \sin\{4^\circ\cdot 5[Y-1807\cdot 52]\}$$

because such a term does exist, and its coefficient had not then been determined. But experience showed that this term did not represent the observations with sufficient closeness, and failed to represent the observations made prior to 1750; so it was replaced by the two terms

$$\begin{aligned}&+1''\cdot 95 \sin\{2\cdot 8[Y-1764\cdot 0]\}\\ &+2''\cdot 69 \sin\{4\cdot 1[Y-1802\cdot 5]\}\end{aligned}$$

Both represent arguments of actually existing terms whose values had not then been calculated.

Later the development of my theoretical work enabled me to extend the results to those given in the preceding expression, when the last seven inequalities which are expressed in terms of their annual increments do not depend on arbitrary arguments, but have had their annual motion and epoch fixed within narrow limits by their theoretical values.

But if purely empirical terms be employed with arguments of arbitrarily assigned motion and epoch, it is possible to represent the observed values by a thousand different combinations of two or three such terms. But this cannot be legitimate, and any term chosen to represent the outstanding tabular errors must be one that is theoretically possible, and so one whose epoch can be calculated from theory with some degree of approximation.

In addition to the two terms mentioned by Mr. Cowell as

1905MNRAS..65..266N

having arguments of the same period as that of the term he has deduced from the observation there are a number of others, such as the three depending on the arguments

$$\begin{aligned} &D \quad -15V+12E \\ &2D-4z+42V-40E \\ &\varpi+\ 2E-\ 4M \end{aligned}$$

The values of the coefficients of these terms as calculated by M. Radau's formulæ will be found to be much smaller than is required by Mr. Cowell; but this will be the case with the coefficient of every inequality of this period when so calculated. For the equation employed by M. Radau will not yield a coefficient exceeding a second of arc to any possible term of this period, unless values be assigned to Δb^{ι} or ∇b^{ι} respectively which are far beyond the maximum values of these functions.

Natal Observatory: 1904 *December* 9.

The Longitude of the Moon's Perigee. By P. H. Cowell.

In this paper I conclude my discussion of the Moon's observed longitude. I discuss the coefficients of $\sin g$ and $\cos g$, and I give values of the Moon's mean longitude and mean longitude of perigee.

To the values of the coefficients of $\sin g$, $\cos g$, derived from columns 53^s2, 53^c2 in Tables VIII., IX., *Monthly Notices*, vol. lxv. December, I have applied the following corrections, based upon the analyses exhibited in Table X. of that paper :

To the coefficients of $\sin g$—

(i.) $-0''\cdot 7\cos(\omega-\omega')+0''\cdot 2-0''\cdot 7\sin(2D-2g+3V-3E)$

for the Airy period ;

(iii.) $-0''\cdot 7\cos(\omega-\omega')-0''\cdot 2$

for the Hansen period.

To the coefficients of $\cos g$—

(i.) $-0''\cdot 3\sin(\omega-\omega')-0''\cdot 7\cos(2D-2g+3V-3E)$
$-1''\cdot 0\sin(-\Omega)+2e\,\Delta g$

for the Airy period ;

(iii.) $-0''\cdot 7\sin(\omega-\omega')$

for the Hansen period.

Δg is the sum of (i.) the long-period *Venus* term ; (ii.) Newcomb's empirical term with the same argument ; (iii.) $-11''$.